Patent
Attorney's Docket No. 0331-011

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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| In re Patent Application of | ) | **BOX Appeal Brief** |
| Fred Stacey et al. | ) | Group Art Unit: 2615 |
| Application No.: 09/818,252 | ) | Examiner: Eva Yi Zheng |
| Filed: March 26, 2001 | ) | |
| For: SYSTEM AND METHOD FOR SYNCHRONIZING SAMPLE RATES OF VOICEBAND CHANNELS AND A DSL INTERFACE CHANNEL | ) | |

# APPEAL BRIEF PURUSANT TO 37 C.F.R §41.37

Commissioner for Patents
Alexandria, VA 22313-1450

Sir:

This second Appeal Brief is filed in response to the Notification of Non-Compliant Appeal Brief mailed August 8, 2005. The Appendix now contains a correct listing of the appealed claims.

Further to the Notice of Appeal filed on April 18, 2005 in connection with the above-identified application, submitted herewith is the requisite Appeal Brief. The required fee was paid with the Appeal Brief filed on June 20, 2005.

(i) REAL PARTY IN INTEREST

The real party in interest is the assignee, CIENA Corporation.

(ii) RELATED APPEALS AND INTERFERENCES

To the best of the undersigned's knowledge, there are no related appeals or interferences.

(iii) STATUS OF CLAIMS

Claims 1-3 and 6-12 are currently pending, have all been finally rejected and are all the subject of this appeal. Claims 4 and 5 are allowed.

(iv) STATUS OF AMENDMENTS

No Amendments have been submitted in this application subsequent to the Final Office Action.

(v) SUMMARY OF CLAIMED SUBJECT MATTER

Exemplary embodiments of the present invention provide, among other things, an interface that integrates a Digital Subscriber Line (DSL) line interface with a voice circuit interface using a common Analog-to-Digital Converter (ADC) and/or a common Digital-to-Analog Converter (DAC). To facilitate implementation of a common ADC and/or DAC, exemplary embodiments of the present invention provide both systems and methods for synchronizing received DSL (data) signals and received voice signals.

In one exemplary embodiment, referring to Figure 2, an oscillator 22 provides clock timing for an integrated voice and data reception system. A voice (PCM) signal is provided from the PSTN interface 21 at a sample frequency of, for example, $8 + \delta$, where $\delta$ represents a frequency offset between nominal values of the DSL transmit clock and PSTN transmit clock. The voice signal is then converted from the compressed PCM samples to a linear format. The linear voice signal is upsampled by a low pass filter so that the frequency of the linear voice signal is at least similar (order of magnitude) to the frequency of the oscillator 22.

Data signals are also being received during this time. The upsampled voice signal cannot simply be added to the modulated data signal at this point because the two signals are at different sampling frequencies. Therefore, a re-timer is used to perform a rate conversion between the upsampled voice signal and the modulated data signal. Rate conversion can be implemented at the oversampled rate via sample slips as long as the oversampled rate is sufficiently high. This process results in a synchronized combination of the voice and data signals which are then converted to an analog signal by a single DAC. *See*, e.g., page 4 lines 12-34 and page 5 lines 1-18 of the present specification.

According to another exemplary embodiment of the present invention, a method for synchronizing a PSTN clock and a DSL clock includes the steps of determining the phase offset between a voice signal and a data signal and shifting one of the voice or data signals to synchronize the voice signal and the data signal. For example, a rate conversion unit, e.g., a phase interpolation unit, uses phase offset information to regenerate samples passing through the phase interpolation unit at new phases corresponding to that of an output sample clock to perform synchronization. *See,* e.g., Figure 3, block 62 and page 6, line 14 et seq. of the specification.

(vi) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A number of grounds of rejection are raised by the Examiner and listed below. Appellants request review of each of these grounds of rejection on appeal.

a. Claims 1-3, 8-9 and 11-12 stand rejected under 35 U.S.C § 102(e) as being allegedly anticipated by Jones (U.S. 6,310,909 B1, hereafter "Jones").

b. Claims 1-3, 8-10 and 11-12 stand rejected under 35 U.S.C. § 102(e) as being allegedly anticipated by Long et al. (U.S. 5,991,311, hereafter "Long").

c. Claim 1 stands rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over applicant admitted prior art (AAPR) in view of Jones.

d. Claims 6-7 stand rejected under 35 U.S.C § 103(a) as being allegedly unpatentable over Long in view of applicant admitted prior art (AAPR).

(vii) ARGUMENT

(a) Summary

Jones relates to an apparatus and method for providing digital communications via twisted pair telephone lines in DSL systems. More specifically Jones describes a method of rate adaptive DSL used to maximize the bit rate between two DSL transceivers. Jones is unconcerned with synchronizing voice and data signals.

Long describes using time compression multiplexing (TCM) DSL data over phone lines in a system that also transceives TCM-ISDN data. In Long, a burst generator acts as a timing device to synchronize the TCM-DSL data and TCM-ISDN data to eliminate near end crosstalk (NEXT). Additionally, splitters can be used that have a low-pass filter to filter out voice calls and splitters can have a high-pass filter that outputs the high frequency

components to TCM-DSL modems. Long is also unconcerned with synchronizing voice and data signals.

While both Jones and Long describe DSL communications, neither approach describes a solution to the problem that is solved by Appellants. The present invention synchronizes voice and data transmissions to, among other things, provide a system that allows voice and DSL transmissions to utilize the same DAC and/or ADC. This fundamental difference between the methods and systems recited in Appellants' claimed combinations and the documents applied in the Final Rejection translates into a number of specific differences which will now be discussed below with respect to independent claims 8, 10 and 1, respectively.

(b) Claim 8 – Jones Fails to Teach Either Claimed Step

Appellants' independent claim 8 combination recites a method of synchronizing a public switched telephone network (PSTN) voice signal and a digital subscriber line (DSL) data signal which includes the following two steps:

(a) upsampling the voice signal, to increase said voice signal's frequency to a frequency comparable with that of the data signal; and

(b) sample slipping one of said voice signal and said data signal, to synchronize said voice signal and said data signal.

Jones teaches neither of these steps. With respect to the first step, in the Final Office Action dated January 7, 2005 (paragraph 4(d)), the Examiner indicates that upsampling the voice signal is allegedly found in FIG. 2 block 17 of Jones. Appellants respectfully disagree. Block 17 in Fig. 2 of Jones depicts a transmit filter, and as described at col. 6, lines 12-17 of

Jones, "[T]he analog signal output by the DAC 16 is provided to transmit filter 17, which typically includes a low pass filter (e.g., third order Butterworth) which removes undesirable high frequency components generated by the DAC 16. In this manner, the transmit filter 17 reduces undesirable out-of-band energy" (emphasis added).

Upsampling, by way of contrast, refers to the process of increasing the sample rate of a signal. The transmit filter 17 of Jones does not perform the function of upsampling the voice signal to a frequency comparable with that of the data signal as set forth, among other features, in Appellants' claim 8 combination.

Referring now to the second step of claim 8, it is respectfully submitted that the transmit filter 17 of Jones also does not teach the step of sample slipping one of the voice signal and the data signal to synchronize the voice signal and the data signal. The Final Office Action (at paragraph 4(d)) references column 6, lines 12-17 of Jones as also allegedly teaching this claimed step. As mentioned above, this section of Jones refers to operation of the transmit filter 17 which operates to remove high frequency components. Transmit filter 17 does not perform sample slipping that results in synchronization between the voice signal and the data signal, nor does the Examiner attempt to explain how the removal of high frequency components can reasonably be said to correspond to both upsampling and sample slipping.

For at least the foregoing reasons, it is respectfully submitted that Jones fails to anticipate Appellants' claim 8 combination. Similar comments apply to claim 9 which depends therefrom.

(c) Claim 8 – Long Also Fails To Teach Either Step

Appellants' independent claim 8 combination recites a method of synchronizing a public switched telephone network (PSTN) voice signal and a digital subscriber line (DSL) data signal which includes the following two steps:

(a) upsampling the voice signal, to increase said voice signal's frequency to a frequency comparable with that of the data signal; and

(b) sample slipping one of said voice signal and said data signal, to synchronize said voice signal and said data signal.

The Final Office Action refers to block 104 in Fig. 11 and col. 10, lines 40-60 in Long with respect to the structure in Long which allegedly corresponds to these claimed method steps. In the referenced section, Long describes how a carrierless amplitude/phase modulation (CAP) filter shapes the transmitted pulses and places the transmitted signal into the desired frequency band and that the output from the CAP filter can have a higher sampling rate.

However, this section of Long describes a TCM-DSL modem and its operation on a data stream. CAP filter 104 operates on a data signal, not a voice signal. Thus it is respectfully submitted that CAP filter 104 cannot possibly perform the claimed step of "upsampling the voice signal, to increase said voice signal's frequency to a frequency comparable with that of the data signal" (emphasis added).

With respect to the step of "sample slipping one of said voice signal and said data signal, to synchronize said voice signal and said data signal", reference is made in the Final Office Action to column 10, lines 40-46 of Long. This section of Long describes filtering, buffering and D/A conversion of data signals. Nowhere in this section of Long is there any

reference whatsoever to sample slipping that results in synchronization of a voice signal and a data signal.

For at least the foregoing reasons, it is respectfully submitted that Long fails to anticipate Appellants' claim 8 combination. Similar comments apply to claim 9 which depends therefrom.

(d) Claim 10 – Long Fails to Teach Either Step

Appellants' independent claim 10 combination recites a method of synchronizing a public switched telephone network (PSTN) voice signal and a digital subscriber line (DSL) data signal, the method includes the following two steps:

(a) determining a phase offset between the voice signal and the data signal; and

(b) shifting one of said voice signal and said data signal according to said phase offset to synchronize said voice signal and said data signal

The Final Office Action refers to block 128 in Fig. 13 and col. 12, lines 20-25 in Long as allegedly disclosing structure which performs these method steps. Review of this section of Long indicates, however that the phase offset 128 determined by Long is the phase difference between a 400 Hz clock and the measured downstream TCM ISDN timing window which is used to generate a DSL downstream timing window in a manner that ensures that the DSL downstream window and ISDN downstream window remain in phase. This Figure, and the corresponding text, is unconcerned with voice signals. Therefore, phase offset 128 of Long cannot reasonably be said to correspond to a phase offset between a voice signal and a data signal as set forth in step (a) of Appellants' claim 10 combination.

As mentioned in the Summary above, Long is concerned with operations on two different data signals, not with the synchronization of a voice signal and a data signal. Thus, the synchronization performed in the referenced section of Long also fails to teach or suggest step (b) of Appellants' claim 10 combination. For at least the foregoing reasons, it is respectfully submitted that Long fails to anticipate Appellants' claim 10 combination.

(e) Claim 1 – Jones Fails to Teach or Suggest the Claimed Synchronization Circuit Whether Taken Singly or in Combination with "AAPR"

Appellants' independent claim 1 combination recites a system for synchronizing voice signal received via a public switched telephone network (PSTN) and data signal received via a digital subscriber line (DSL) including, among other things, a synchronization circuit coupled to synchronize the voice signal and data signal and a converter circuit coupled to convert the synchronized voice signal and data signal.

The Final Official Action states:

> "Jones explicitly states that when transmitting signals from the transmitter to receiver the twisted pair telephone loop 23 is permitted transmitting of communication signals (Col 6, L 18-24). Jones's invention is particularly relates to digital communication via twisted pair telephone lines in DSL system and voice band signals. Thus, Jones didn't fail to handle voice signals and Jones meets all the limitations in amendment claims 1-3 and 8-9."

However, Appellants respectfully note that its claim 1 combination includes "a synchronization circuit coupled to synchronize said voice signal and said data signal". At least this feature, in combination with the other features in claim1, is not found in Jones. Jones merely describes that "the analog to digital converter 27 may be synchronized to timing recovery circuit 29, which facilitates synchronization of two communicating transceivers".

*See* Jones at col. 6, lines 39-41. However synchronizing two communicating transceivers is not the same as synchronizing a voice signal and a data signal. Nowhere does Jones teach the claimed synchronization circuit, thus Appellants respectfully submit that Jones cannot be said to anticipate Appellants' claim 1 combination.

The Final Office Action also offers an alternative rejection of claim 1 using Jones in combination with Figure 1 of Appellants' own specification (identified in the Office Action as "AAPR".) More specifically, the Final Office Action states that "it would have been obvious to one of ordinary skill in the art at the time of invention was made to employ the synchronization circuit by Jones in the voice circuit of AAPR in order to improve efficiencies of the framing rate of the voice channels in the DSL data streams." However neither Jones nor Appellants' description of Figure 1 provide any hint or suggestion that somehow grafting the synchronization circuit of Jones into the system of Figure 1 would "improve efficiencies of framing rate of voice channels in DSL data streams".

Moreover, even if these two descriptions were somehow combined, Appellants respectfully disagree that synchronizing the two transceivers of Jones in combination with the circuitry in Figure 1 would have lead one of ordinary skill in the art to a synchronization circuit coupled to synchronize said voice signal and said data signal as set forth, among other things, in Appellants' claim 1 combination.

For at least the foregoing reasons, it is respectfully submitted that Jones both fails to anticipate Appellants' claim 1 combination under 35 U.S.C. §102 and fails to render claim 1 unpatentable in view of AAPR under 35 U.S.C §103. Claims 2, 3, 11 and 12 are also respectfully submitted to be patentable for similar reasons as they each ultimately depend from claim 1.

(f) Claim 1 – Long Fails to Teach the Claimed Synchronization Circuit

Independent claim 1 also stands rejected under 35 U.S.C § 102(e) as being allegedly anticipated by Long. According to claim 1 of the present invention ,a system for synchronizing voice signal received via a public switched telephone network (PSTN) and data signal received via a digital subscriber line (DSL), the system includes a PSTN interface coupled to transmit and receive the voice signal; a data DSL transceiver coupled to modulate and demodulate the data signal; a synchronization circuit coupled to synchronize said voice signal and said data signal; and a converter circuit coupled to convert the synchronized voice signal and the synchronized data signal between analog and digital formats.

By way of contrast, and as mentioned above, the Long patent relates to a system for synchronizing TCM-DSL timing to TCM-ISDN timing by controlling send and receive windows to reduce crosstalk. The Final Office Action refers to Fig. 11 in Long as a basis for this ground of rejection. Specifically block 98 in Fig. 11 of Long is alleged to depict a synchronization circuit coupled to synchronize said voice signal and said data signal, and block 44 in Fig. 11 of Long is alleged to depict a converter circuit coupled to convert the synchronized said voice signal and the synchronized data signal between analog and digital formats. Applicants strenuously disagree with these characterizations as set forth below.

Fig. 11 of Long depicts a DSL modem. As described in column 10, lines 47 et. seq. of Long, block 98 in Fig. 11 is a burst timing control used to control data send and receive windows. Block 44 in Fig. 11 of Long is an A/D and D/A converter used to convert data signals from digital to analog or analog to digital as needed. Voice signals are not used by

the modem in Fig. 11 of Long. Therefore, these descriptions in Long could not possibly anticipate a synchronization circuit coupled to synchronize said voice signal and said data signal in combination with the other elements of Appellants' claim 1 combination. Similar comments apply to claims 2, 3, 11 and 12 which ultimately depend from claim 1.

(g) Claims 6 and 7 --- Long and AAPR Fail To Teach or Suggest Claimed Synchronization Circuit

Claims 6 and 7 stand rejected under 35 U.S.C. §103 as allegedly being unpatentable over Long in view of Appellants' Figure 1 (AAPR). These claims are respectfully submitted to be patentable for the reasons set forth above with respect to claim 1 from which they depend.

Moreover, in the Final Office Action (at numbered paragraph 8), it is alleged that block 128 of Fig. 13 of Long corresponds to "a phase offset detection circuit coupled to detect a phase difference between a PSTN clock associated with said voice signal and said a DSL clock associated with said data signal". Appellants strenuously disagree with this characterization of block 128 of Long. Referring now to the description of Figure 13 found at column 12, lines 5-25 of Long, it can be seen that the phase offset 128 is the phase difference between a 400Hz clock signal and the measured downstream TCM ISDN timing window. The phase offset 128 has nothing to do with a voice signal, which is not surprising because Long is concerned with crosstalk between two different data signals (DSL and ISDN).

The structure in Figure 1 of the present specification does not remedy this deficiency of Long. Accordingly, it is respectfully submitted that Long in view of AAPR cannot reasonably be said to render Appellants' claim 6 and 7 combinations unpatentable

(h) Conclusion to Arguments

For at least the foregoing reasons, it is respectfully submitted that the independent claims 1, 8 and 10 are patentable over the documents cited. The dependent claims are also allowable for at least the reasons set forth above with respect to the independent claims from which they depend, as well as those independent bases described above. Accordingly, it is respectfully requested that the grounds of rejection set forth in the Final Official Action of January 7, 2005 be REVERSED.

Respectfully submitted,
POTOMAC PATENT GROUP PLLC

By: ______________________
Steven M. duBois
Registration No. 35,023

(viii) CLAIMS APPENDIX

1. A system for synchronizing voice signal received via a public switched telephone network (PSTN) and data signal received via a digital subscriber line (DSL), the system comprising:

a PSTN interface coupled to transmit and receive the voice signal;

a data DSL transceiver coupled to modulate and demodulate the data signal;

a synchronization circuit coupled to synchronize said voice signal and said data signal; and

a converter circuit coupled to convert the synchronized voice signal and the synchronized data signal between analog and digital formats.

2. The system of claim 1, wherein said converter circuit converts said voice signal and said data signal from a digital format to an analog format for transmitting a combined voice and data signal.

3. The system of claim 1, wherein said converter circuit converts said voice signal and said data signal from an analog format to a digital format for receiving a combined voice and data signal.

4. A system for synchronizing voice signal received via a public switched telephone network (PSTN) and data signal received via a digital subscriber line (DSL), the system comprising:

a PSTN interface coupled to transmit and receive the voice signal;

a data DSL transceiver coupled to modulate and demodulate the data signal;

a synchronization circuit coupled to synchronize said voice signal and said data signal; and

a converter circuit coupled to convert the synchronized voice signal and the synchronized data signal between analog and digital formats; wherein said synchronization circuit synchronizes said voiceband signal with said DSL signal and

comprises:

a second converter circuit coupled to convert said voice signal from a companded format to a linear format;

an upsampler circuit coupled to increase a frequency of said voice signal from $(8 + \delta) \cdot M$ kHz to $(8 + \delta) \cdot M$ kHz; and

a re-timer circuit coupled to synchronize the upsampled voice signal with said data signal.

5. A system for synchronizing voice signal received via a public switched telephone network (PSTN) and data signal received via a digital subscriber line (DSL), the system comprising:

a PSTN interface coupled to transmit and receive the voice signal;

a data DSL transceiver coupled to modulate and demodulate the data signal;

a synchronization circuit coupled to synchronize said voice signals and said data signal; and

a converter circuit coupled to convert the synchronized voice signal and the synchronized data signal between analog and digital formats; wherein said synchronization circuit synchronizes said voice signal with said PSTN signal and comprises:

a re-timer circuit coupled to synchronize upsampled voice signal with a PSTN clock;

a downsampler circuit coupled to reduce a frequency of said upsampled voice signal from $(8 + \delta) \cdot M$ kHz to $(8 + \delta)$ kHz; and

a second converter circuit coupled to convert the downsampled voice signal from a linear format to a companded format.

6. The system of claim 1, wherein said synchronization circuit synchronizes said voice signal with said data signal, and comprises:

a phase offset detection circuit coupled to detect a phase difference between a PSTN clock associated with said voice signal and a DSL clock associated with said

data signal;

a phase interpolation circuit coupled to adjust said voice signal according to the detected phase difference; and

a multiplexer circuit coupled to multiplex said data signal with the adjusted voice signal for transmission.

7. The system of claim 1, wherein said synchronization circuit synchronizes said voice signal with said data signal and comprises:

a phase offset detection circuit coupled to detect a phase difference between a PSTN clock associated with said voice signal and a DSL clock associated with said data signal;

a demultiplexer circuit coupled to demultiplex said voice signal and said data signal from a received signal; and

a phase interpolation circuit coupled to adjust said voice signal according to the detected phase difference.

8. A method of synchronizing a public switched telephone network (PSTN) voice signal and a digital subscriber line (DSL) data signal, the method comprising the steps of:

upsampling the voice signal to increase said voice signal's frequency to a frequency comparable with that of the data signal; and

sample slipping one of said voice signal and said data signal to synchronize said voice signal and said data signal.

9. The method of claim 8, wherein said step of sample slipping synchronizes said voice signal with said data signal.

10. A method of synchronizing a public switched telephone network (PSTN) voice signal and a digital subscriber line (DSL) data signal, the method comprising the steps of:

determining a phase offset between the voice signal and the data signal; and

shifting one of said voice signal and said data signal according to said phase offset to synchronize said voice signal and said data signal.

11. The system of claim 1 further comprising:
circuitry adapted to combine the voice signal and the data signal.

12. The system of claim 11 further comprising:

a converter circuit coupled to convert the combined voice and data signals between analog and digital formats.

(ix) EVIDENCE APPENDIX

None.

## (x) RELATED PROCEEDINGS APPENDIX

None.

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TW

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# TRANSMITTAL FORM

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| First Named Inventor | Fred STACEY et al. |
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## ENCLOSURES *(Check all that apply)*

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**Remarks**

This is a second copy of the Appeal Brief (in triplicate) being filed in response to the Notificiation of Non-Compliant Appeal Brief mailed August 8, 2005.

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

| | | | |
|---|---|---|---|
| Firm Name | Potomac Patent Group, PLLC | | |
| Signature | S. M. duBois | | |
| Printed name | Steven M. duBois | | |
| Date | August 17, 2005 | Reg. No. | 35,023 |

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| Signature | S. M. duBois | | |
| Typed or printed name | Steven M. duBois | Date | August 17, 2005 |